

REMARKS

This RCE is intended to continue prosecution of application no. 10/014, 415 following the final action dated April 21, 2004. Applicant's intention in this regard was expressed to the Examiner, Mr. Kim, during an interview with the Applicant and his undersigned attorney on September 12, 2004, the courtesy of which interview Applicant hereby acknowledges. Applicant further confirms the accuracy of the substance of the record of the Interview Summary prepared by the Examiner on that date¹

I. Background

In the Office Action April 21, 2004, the Examiner finally rejected claims 1, 3-6, 9, 11-14, 20-22, 24, 25, and 27-33 under 35 U.S.C. § 103(a) for obviousness over various combinations of the prior art, principally *Owens* (US 4,078,377); *Leonard et al.* (US 5,319,923); *Powter et al.* (US 2,621,477); *Komatsu et al.* (US 5,343,693); *Rubins et al.* (US 4,150,539);² *Holzapfel* (US 4,350,009); *Ohyama et al.* (US 5,533,329); and the "admitted prior art" (Figs. 1-15 and Mowill US 5,765,363), in view of any of *Willis et al.* (US 5,121,508); *Blaha* (US 2,904,108); and *Blaha* (US 2,669,300).

Specifically, in respect of each of the last three of the above mentioned references, the Examiner asserted that these show a "segmented exit area" used to "prevent turbulence" or "enhance tangential dispersion into the combustion chamber." See paras. 9 and 10.

¹ The original Interview Summary incorrectly reported the interview date as December 9, 2004 (12/09/04) rather than September 12, 2004 (09/12/04). Applicant's attorney reported this error on September 14, 2004 and the Examiner requested that the error be corrected by annotating the Interview Summary.

² The Examiner rejected claims 8, 20, 28-33 under § 102(b) over *Rubins et al.*, but at para. 7 of the Office Action, states that *Rubins et al.* do not teach an air valve and a fuel valve. Because the Examiner subsequently cites the "admitted prior art" for these features, Applicant has treated this rejection as a rejection under § 103(a), particularly in view of the concluding sentence of that paragraph.

The Examiner indicated that claim 26 contained allowable subject matter, but objected to that claim as being dependent on a rejected base claim.

II. Amendment to the Drawing

Subject to the approval of the Examiner, Applicant proposes to amend Fig. 9A to change reference character 843 to 842. This drawing change is indicated on a drawing Replacement Sheet attached hereto.

III. Amendments To The Pending Claims

Initially, Applicant has amended claim 6 to read independently and has amended claim 27 to depend from claim 26. Hence, amended claims 26 and 27 are in condition for allowance, and Applicant respectfully requests such action.

Further, and to expedite prosecution of the present RCE application, Applicant has cancelled claims 28-33 which are directed to the apparatus and methods having valve control of the fuel and air that are supplied to the upstream portion of the mixing tube and separate (independent) valve control of the velocity from the exit of the mixing tube, but which are silent as to the directional control of the fuel/air mixture exiting the mixing tube. Applicant specifically reserves the right to continue prosecution of claims 28-33 and other claims of comparable scope such as in a further, timely-filed continuation application.

Still further, and of importance for the present RCE application, claims 1, 3-5, 9, 11-14, 20-22, 24, and 25, which require structure or step for "directing" (claims 1, 3-5, 9, 24, and 25) or "channeling" (claims 11-14, 20-22) the fuel/air mixture through at least two opposed area portions (or in two opposed directions) relative to the mixing tube axis have been further amended to require that the mixture valve, or a particular mixture valve member, be configured to flow the discharged fuel/air mixture "predominantly"

through the two opposed area portions. The advantage of the claimed preferential flow direction is to better utilize the combustion volume and decrease wall impingement in applications having combustors with a non-cylindrical shape, such as in the annular combustor depicted in Figs. 19A-19C (the elected specie), or circular, can-type-combustors where the premixer is offset from the axis of symmetry.

Support for the present Amendment may be found in the Specification at pages 78 and 79 where it is stated, in regard to the apparatus depicted in Figs. 19A-19C:

Exit ports 1909 together comprise a segmented, generally cylindrical-annular flow area geometry. Nozzle assembly 1972 is thus similar to the nozzle assembly construction depicted in use with predecessor systems, particularly the asymmetric nozzle assembly construction adapted for use with annular combustors.

* * *

The advantages afforded by nozzle assembly 1972 include distributing the fuel/air mixture within the annular combustor without undue wall impingement, as explained in relation to predecessor constructions shown in Figs. 8-11. (Emphasis added).

Referring back to the discussion of the predecessor nozzles shown in Figs. 8-11, the Specification further states *e.g.* at page 49 for Fig. 9A as follows:

Fig. 9A also depicts a nozzle assembly 872' having asymmetric nozzle ports 907a' and 907b' configured to minimize the amount of fuel/air mixture impinging on the axially rear wall of liner 840. That is, the flow directing surfaces 901a' and 901b' of nozzle end cap 872a' are configured to admit the fuel/air mixture into combustion zone 854 predominantly in the tangential direction with respect to axis 842³ of the combustion chamber while still admitting some of the fuel/air mixture into other regions (i.e., to the right and left of the venturi axis 874 in Fig. 9A). This

³ The engine/combustor axis in Fig. 9A is mislabeled as "843"; the correct designation for the axis is "842" as seen in Fig. 9. See also Fig. 8. Applicant has submitted herewith a request for approval of a further drawing correction in respect to Fig. 9A.

asymmetric nozzle port arrangement permits more effective utilization of the combustion volume while minimizing fuel/air mixture impingement on the liner wall, which can lead to carbon build up, uneven heat transfer, and increased thermal stress-caused distortions. (Emphasis added).

Also, Applicant has amended claim 5 to claim two or more channels, and has cancelled claim 6 without prejudice because it does not further limit the scope of claim 3 due to the amendment to claim 1 to require a fuel/air mixture to be discharged “predominantly” in the defined two opposed area portion directions, a feature of the “asymmetric nozzle” previously claimed in claim 6.

Still further, Applicant has amended claim 9, which depends from claim 1, to recite a gas turbine gas generator (instead of an engine) and further limited the gas generator to one having an annular combustor “operatively connected to the mixing tube exit,” and with the “mixture valve positioned such that the flow through [the] two opposed area portions is also substantially tangential to the combustor axis.”

Finally, Applicant has added new method claim 34 dependent from claim 20 and directed to the process of operating the premixer apparatus as part of a gas turbine gas generator having an annular combustor, including the preliminary step of “positioning the mixture valve such that said two opposed directions are substantially tangential to the combustor axis.”

Claims 1-5, 7-9, 11-22, 24-27 and 34 are pending in the above-captioned patent application of which claims 2, 7, 8, and 15-19 are withdrawn from consideration.

IV. Comparison With The Prior Art

During patent examination, the PTO bears the initial burden of presenting a *prima facie* case of unpatentability. *In re Glaug*, 283 F.3d 1335, 1338 (Fed. Cir. 2002). For the Examiner to establish a *prima facie* case of obviousness under 35 U.S.C. § 103,

three basic criteria must be satisfied. First, “there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify a reference or to combine reference teachings.” M.P.E.P. § 2143. “Second, there must be a reasonable expectation of success.” *Id.* Third, “the prior art reference (or references when combined) must teach or suggest all the claim limitations.” *Id.* (Emphasis added).

Viewed in light of the above legal standards, claims 1, 3-5, 9, 11-14, 20-22, 24, and 25 are non-obvious and therefore patentable for at least the following reason: The Examiner has not shown an unequivocal teaching in the prior art to provide premixer exit mixture valve members which direct or channel the discharged fuel/air mixture “predominantly” in the claimed two opposed directions, that is, an asymmetric discharge distribution. Specifically, the constructions in *Willis et al.*, *Blaha* ‘108, and *Blaha* ‘300 do not teach or reasonably suggest the claimed invention. *Willis et al.* discloses premixer outlet 31 as “annular” (col 3, line 8) and does not disclose or suggest that the fins 32 would act to provide the asymmetric discharge pattern as required by the claims as presently amended. *Blaha* ‘108 and *Blaha* ‘300, which are directed to burner apparatus for use in industrial furnaces (see e.g. *Blaha* ‘108 at col. 2, line 11; *Blaha* ‘300 at col. 2, line 35), also teach axi-symmetric fuel/air mixture discharge nozzles. Specifically, *Blaha* ‘300 discloses a plurality of slots 42 separated by fins 41 - Figs. 2-4 (or slots 58 separated by fins 57 - Figs. 5-7), which are symmetric about the nozzle axis. *Blaha* ‘108 teaches an axi-symmetric array of grooves 32 (see Fig. 2). Importantly, there is no clear, unambiguous teaching or suggestion in *Willis et al.*, *Blaha* ‘108, or *Blaha* ‘300 to modify the disclosed structure, which one skilled in the art would consider to provide a circularly symmetric discharge pattern for the fuel/air mixture, to provide the claimed

structure for providing an asymmetric fuel/air mixture distribution. As a consequence, even if combined with the principal references as suggested by the Examiner, *Willis et al.*, *Blaha* '108, and *Blaha* '300 fail to provide a "*prima facie*" case of obviousness such that presently amended claims 1, 3-5, 9, 11-14, 20-22, 24, and 25 together with newly added claim 34 are unobvious over the prior art and therefore patentable under § 103(a).

Moreover, amended claims 9, 11-12, and 25 together with newly added claim 34 recite apparatus or a method that includes structure/steps requiring the two opposed exit area portions to flow or channel the fuel/air mixture in directions tangential to the axis of a claimed annular combustor (or turbine) of a gas turbine gas generator. None of the prior art teaches this additional claimed feature. As a consequence, claims 9, 11-12, 25, and 34 are non-obvious over the prior art and therefore patentable for this additional reason.

Finally, if generic claims are allowed, Applicant reserves the right to request that certain previously withdrawn claims be added back in, if suitably amended to require the mixture flow to be "predominantly" through the two opposed area portions and otherwise contain all the limitations of the allowed generic claim. For example, claims 15-19 that require contouring the outer valve member to provide the preferred flow directions should be allowable if claim 1 or claim 9 is allowed, and claims 15-19 be suitably amended.

Wherefore, Applicant respectfully requests consideration of claims 1, 3-5, 9, 11-14, 20-22, 24, 25, and 34 in light of the above amendments and reasons for patentability. Applicant further requests that the Examiner consider claims 26 and 27 in view of the present amendments and the Examiner's previous indication of allowable


subject matter in claim 26. If the Examiner has questions concerning the amendments and reasons for patentability presented herein, a call to the undersigned is respectfully requested.

Please charge any additional required fees not included with our submission to deposit account 06-0916.

Respectfully submitted,

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Dated: September 21, 2004

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Attachments: Replacement Sheet (Fig. 9A)

AMENDMENTS TO THE DRAWINGS:

Subject to the approval of the Examiner, Applicant proposes to amend Fig. 9A to change reference character 843 to 842. this drawing change is indicated on a drawing Replacement Sheet attached hereto.

Attachments: Replacement Sheet of Fig. 9A (1 Sheet)